Volume 38 Article 4

1-1-1951

Multiple-Use of Forestry in Switzerland

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Multiple-Use of Forestry in Switzerland

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WHEN I was invited to write a short article on multiple use forestry in Switzerland, I was at first somewhat bewildered. The term multiple use forestry, as applied to the general policy of the administration of our National Forests, is not found in its equivalent, in any of the four official languages of Switzerland; German, French, Italian, or Romansh. This does not mean, however, that the principal of multiple use forestry is not recognized in Switzerland. On the contrary, multiple use of the forests rests on customs which date back to prehistoric times and is therefore much older than the concepts of forestry as restricted to wood production alone. It is, indeed, the recognition of the many benefits other than wood, derived from the forest, which have had a decisive influence on the formulation of forestry legislation and the development of Swiss forestry practices.

The magnificent glacier covered peaks of the Alps and the political structure as the world's oldest democracy have made Switzerland famous. They have also dominated the relation between the Swiss people and their forests. An attempt is made in this article to outline briefly, how the political development influenced the customs of forest use in this mountain land, how these customs changed with the intensified economic development of the country, and how public demand brought about forest conservation and the management of the forests in a way that enhances their protective influence on the mountain watersheds and safeguards their aesthetic values.

The lands inclosed within the present boundaries of Switzerland became relatively densely settled soon after the Roman conquest of Gaul, even in the deep valleys penetrating the heart of the Alps. By the middle of the 13th Century, practically all land suitable for agriculture had been cleared and the pattern of distribution between open land and forest has not changed materially since then. During the period of the Frankish kings, only the cultivated land was subdivided and was private property, while the king claimed all undivided land. He exercised mainly the right to the hunt, while the people maintained the right for the free use of the wood and pasture on these lands. During the development of the feudal system the owners of the castles restricted more and more the right of the rural communities. To defend their rights against the Counts of Hapsburg, the peasants

Photo. Dr. W. Nageli.

Forested pastures of Jura Mountains.

of what are now the cantons around Lake Lucerne in the center of present-day Switzerland entered into a defensive league on August 1, 1291, which marks the beginning of the history of the Swiss Confederation. In several heroic battles in the 14th and 15th centuries they obtained complete independence. As a result of these historic developments the forests and the mountain pasture land remained the communal property of the villages. Even today of the total forest area 68.1 percent belong to communities or citizen corporations, 4.8 percent are cantonal or national property and only 27.1 percent are private property, mostly small farm forests. In several of the typical mountain cantons more than 90 percent of the forest land is in communal ownership. The right of each village citizen to his share of the communal forest and pasture prevented the formation of a rural proletariat in Switzerland. It gave the whole community a feeling of security and independence and is one of the foundations of Swiss democracy.

Free use prevailed on the communal land as long as the resource was adequate for the communities. Every citizen was entitled to the wood he needed for building, fencing and heating. There were no restrictions to grazing on the common lands. It is still the common practice for the farmers in the mountain districts to send their livestock to the communal pasture during the growing season. Soon after the snow has disappeared the cattle are taken out of the stables to the mountain pastures which occupy

the benches and the flat ground along the streams, and extend in a broad belt above the timberline to the fields of eternal snow and ice. These pastures are called "Alpen." The mainstay of the Swiss livestock industry is milk and not meat production. While the cows are on the high mountains, the milk is converted into cheese. Since milk production reacts much more quickly to the abundance or scarcity of the food supply than does meat production, grazing allotments to the individual households in the communities have been regulated to conform to what has been found to be the carrying capacity of the various alp units. Erosion caused by over-grazing has, therefore, not been a serious problem in the Swiss mountains.

The forest did not enjoy such intelligent management. It was only towards the end of the last century that forest management was generally introduced. Unrestricted cutting brought about a general deterioration of the forest. In a limited way the early settlers recognized, however, the protection which the forest gave against rolling stones and avalanches and built their villages in the shelter of well wooded slopes. The protecting forests were often declared ban forests and all cutting in them forbidden. Most famous is the ban forest of Altdorf, the town where Tell is said to have shot the apple from the head of his boy. Cutting restrictions from this forest were supported by ancient superstitions that the trees would shed blood if cut with an ax and that the axman's hand would grow out of his grave. Fire, mainly because of the prevailing low hazard, has not been a serious enemy; but poor cutting practices, grazing and litter collection have brought about over the centuries a general deterioration of the forests. It is estimated that in the alpine summer pastures, grazing and wood cutting by the milkers and cheese makers has lowered the timberline at an average by about 600 feet from that determined by climatic factors alone.

Although wood had long ceased to be plentiful and a shortage of timber began to make itself felt toward the middle of the last century, it was the great devastation caused by floods in the middle of the 19th century and again in 1868 which opened the eyes of the Swiss people to the deplorable condition of their forests. It made them realize that complete restoration of the mountain forests to a healthy condition was imperative for adequate watershed protection in the interest of the whole nation. Consequently the primary objective of the first Swiss forestry law of 1876 was to protect the forest of the watersheds in the high mountains. The forest law of 1902, now in force, covers all forests of the land. This law had a far reaching effect on the development of forestry in Switzerland. Some of the more im-

portant provisions mentioned below, express clearly the high esteem in which the Swiss hold their forests.

To stop further deforestation the law provides that the forested area of Switzerland shall not be reduced. At present the forest occupy 2,541,746 acres or 25.0 percent of the total land area, while cultivated and grazing lands compose 52.4 percent, and the unproductive area, consisting of rocks, lakes, glaciers, rivers, roads and built-upon land contains the remaining 22.6 percent of the territory of Switzerland. The law prohibiting a decrease in the aggregate forest area appears the more arbitrary or even drastic when one considers, that the area of arable lands has long been insufficient and that agriculture is losing annually from 7 to 10 thousand acres of its best land to the growth of urban settlements and lines of communications. During World War II this provision was temporarily suspended to allow for increasing the national food production. Normally, Switzerland must depend on imports to supplement its domestic production of food and timber, the food supply shortage was, however, much more critical.

Further provisions of the forest law provide that all public forests be managed according to approved management plans to safeguard their productivity. The cantons, which correspond

Photo. Hans Burger.

All-aged selection forest near St. Moritz.

politically to the States in this country, are obliged to classify the forests into protection and nonprotection forests. Clearcutting shall, generally, be forbidden in protection forests. This provision applies to private as well as public forest properties. On nonprotection forests the private owner is free in the management of his forest property as long as he keeps it in forest growth. All harmful use of the forest for products other than wood (Nebennutzungen), especially grazing and litter collection, are forbidden or allowed only to a moderate extent, in all public forests as well as in the private protection forest. Most of such rights and servitudes have been expropriated against compensation in money or forest land. To compensate communities and private owners for the loss of freedom in the disposition of their forest property the federal government contributes to the cost of afforestation and the erection of structures necessary for erosion control on the headwaters, as well as to the construction of forest roads and of permanent installations for the extraction of timber.

More important than the law in reducing grazing in the forests has been a general improvement and intensification of the livestock industry. The increase in cattle from 1866 to 1947 and the simultaneous reduction in sheep and goats reflects this improvement which brought about a greater demand for good pasture and lessened the need for low quality sheep and goat range.

NUMBER OF LIVESTOCK IN SWITZERLAND

Year	*Cattle*	*Sheep*	*Goats*
1866	993,291	447,001	375,482
1947	1,450,773	182,467	189,018

The tendency has been toward a strict separation of forest and pasture. Grazing in the forests of the lowlands has almost completely disappeared. On the high mountains, especially near the timberline, the boundary between forest and grassland is generally not well defined and fluid, and a certain amount of forest grazing is here inevitable. Typical forest pastures are now found only in the open larch forests and in the forested pastures of the broad plateaus of the Jura mountains. Here a joint use for grazing and wood products is the most efficient and only practical method of land management.

The provision of the forest law concerning federal contributions to the cost of forest roads in protection forest had a great beneficial influence on the development of good forest management. This help enabled the communities to build the necessary access roads which are a prerequisite for conservative timber cutting in mountain forests. Equally important is the financial help for reforestation, structures to hold back avalanches and to

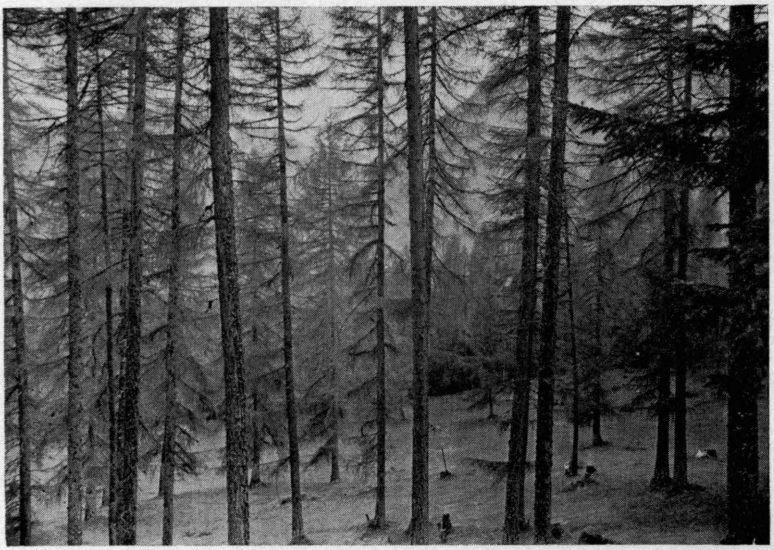

Photo. H. Knuchel.

Forest pasture with 80 to 100 year old larch trees near Filisur, Switzerland at 4350 feet above the sea.

stabilize streambeds. These costly works could not be accomplished without substantial contributions from the Federal Government.

Just as in this country the early development of forestry and its guidance on a sure path is intimately linked with the name of Gifford Pinchot, so in Switzerland Dr. John Coaz supplied the driving spirit during 63 years of his professional activity, much of the time as chief forester in Switzerland. It may be of interest to note here that these two men bore close physical resemblance to each other.

Since the shift from an agrarian to an industrial economy, which began approximately 70 years ago in Switzerland, the production from the forests had to be supplemented by imports, to satisfy the domestic demand of about 0.9 m^3 per capita. A little more than one half of this is firewood. Of the total average annual wood consumption, which varied between 3½ and 4 million cubic meters from 1925 to 1939, about one sixth came from net imports. During the war the average annual wood consumption rose to over 5 million cubic meters, because wood had to substitute for coal, which is almost entirely imported from Germany. Also paper, which was formerly mainly imported, had to be produced from domestic sources. At the same time imports

dropped to less than one third of the average prewar amount. As a result, during the seven years from 1940 to 1946 inclusive, the forests had to be overcut at the rate of 61 percent of the regular cut. Luckily the public forest had built up considerable reserves, thanks to a conservative management policy, and were well able to make this sacrifice to the national welfare during the emergency, but the private forests, where the cutting had been relatively more severe, were heavily damaged during those years.

The Swiss public forests are among the most intensively managed of the world. There is, exclusive of private forests, about one technically trained forester for each 7,500 acres of forest and for communities, which have their own technical foresters, the area is about half of that. Administrators generally stay on the same post for many years, and thus become intimately acquainted with their forests and are able to observe the results of their silvicultural practices. The average annual yield of the forests of 50 cubic feet per acre, compared with 31.5 for the United States can be considered quite high and the average annual net income (1920-1939) from the public forests of about 20 Swiss francs, equivalent to about 5 U.S. dollars. per acre, very satisfactory in view of the difficult logging conditions which prevail on the large portion of the forests located on high mountains.

To assure competent management of their forests the Swiss established in 1855 a forestry school at the polytechnicum at Zurich. Prior to the establishment of this school Swiss foresters received their technical training in Germany. At that period the dogma of the soil rent and the clear-cutting system, developed in the extensive pine stands of the flat lands of northern Germany and oriented solely toward the wood production aspect of the forest, dominated the forestry teaching. It became however apparent that these methods could not be applied blindly to the complex mountain forests of Switzerland without jeopardizing their highest function, which lies in the protection of the land. The first manisfestation of an independent Swiss forestry development showed itself in the field of silviculture. Practices were developed which by group-wise and single tree selection aimed at combining maximum wood production with uninterrupted soil protection. Outstanding among the many practical foresters which lead this movement are H. Biolley and W. Ammon; and under the inspired teaching of Professor A. Engler a whole generation of Swiss foresters grew up with a conception of silviculture based on the many-aged selection forest. In the control method Biolley created a suitable tool for regulating the cut of selection forests, which has received world-wide recognition.

It is natural that the recreational values of the forest rank

very high in view of the great importance of the income from tourist trade in Switzerland's economy. Chambers of commerce of resort towns and local development societies have constructed forest paths, benches, fountains, direction signs, etc. to facilitate the enjoyment of the forests. The American tourist traveling in an automobile would, however, look in vain for the large camp grounds and recreation areas of our National Parks and National Forests. The great majority of tourists come to Switzerland still by train; and the Swiss enjoy their beautiful scenery the slow and hard way, on foot and not from an automobile. One may walk on footpaths for miles through forests and meadows unhampered by barbed-wire fences or no-trespassing signs. Short walks with the family or with friends after a street car ride to the outside of the city or a short train ride are as much a part of life as our Sunday afternoon rides. Generally, the destination of these trips is a small restaurant located on a mountain, where one can rest and enjoy the view from an open terrace, but when the Father, who carries the pocketbook in Switzerland, is not along, a snack from the rucksack supplies the refreshments. Thanks to a highly developed and well-served transportation system, every place, with

Photo. Kantonsforstamt Uri.

Reforestation and stream bed stabilization near Altdorf.

the exception of the higher peaks, is within a half-day hike from a railroad or bus line. Not only the better known places, but virtually every spot in Switzerland is at least occasionally visited on these wanderings. The Swiss public is, therefore, very familiar with its forests and is very proud of them. When it views its landscape, it does not see property lines following sectional subdivisions, it sees the fields in the valleys, the roads fitted to the contours of the land, and the forests, unmarred by large clear-cuttings, covering and protecting the steep slopes. It likes what it sees and wants to keep it that way.

FACTS ABOUT THE AUTHOR

Rudolph Stahelin graduated from the Swiss Forestry School at Zurich in 1921. He has been employed with the U. S. F. S. since 1932 with time out to obtain a M. S. from California in 1935. At various times he has been assigned to the California, the Rocky Mountain and the Southern Experiment Stations. Since 1948 he has been with the Division of Forest Economics in Washington, D. C.